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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
MEW, KEVIN D	

ART UNIT	PAPER NUMBER
2664	

DATE MAILED: 09/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/678,907	ATARIUS ET AL.	
	Examiner	**Art Unit**	
	Kevin Mew	2664	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 29 July 2005.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 10-11,15,25,26,30-58,62 and 66-82 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) 10,11,25,26,31-58,62 and 66-72 is/are allowed.

6)☒ Claim(s) 15, 30, 73-82 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Detailed Action

Response to Amendment

1. Applicant's Arguments/Remarks filed on 7/29/2005 regarding claims 15, 30, 73-82 have been considered and claims 10-11, 15, 25-26, 30-58, 62, 66-82 are currently pending. Claims 81-82 are newly added and claims 1-9, 12-14, 16-24, 27-29, 59-61, 63-65 have been canceled by the Applicant.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 15, 30, 73-82 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art, Easton (USP 5,764,687) in view of Lundby et al. (US Publication 2003/0174758).

Regarding claims 15, 30, Easton discloses a transceiver to perform a method for processing code division multiple access signals received (**analog transmitter and receiver for demodulating a signal in a spread spectrum multiple access communication system**, see lines 1-4, col. 2, lines 41-43, col. 8 and lines 23-26, col. 7, and element 16, Fig. 2) through at least one multipath propagation channel (**the searcher searches out windows of offsets likely to contain multipath signal peaks suitable for assignment of the fingers**, see elements 14,

12a-c, Fig. 1) to produce at least one relative frequency error estimate (**frequency error**, see element 44, Fig. 3), comprising:

a processor (**analog transmitter and receiver**, see element 16, Fig. 1) for receiving and processing the signals using the local frequency reference oscillator to obtain representative complex numerical samples (**I and Q channel samples**) for processing (**analog transmitter and receiver containing a downconverter chain that outputs digitized I and Q channel samples at baseband and the sampling clock used to digitized the received waveform is derived from a voltage controlled local oscillator**, see lines 11-15, col. 5 and elements 16, 40, Fig. 2);

channel estimators for correlating (**dispreading**) the complex numerical samples (**I and Q chip samples are provided to QPSK despreaders**, see elements 104a and 104b, Fig. 3) with shifts of a locally generated despreading code (**I and Q PN sequences are generated from PN sequence generator**, see Fig. 3) and producing a number of complex channel estimates (**output of on-time despreader**, see line 53, col. 9 and signals going into Pilot Filers, Fig. 3), each corresponding to a different delayed ray of the at least one multipath propagation channel (**I and Q PN sequences are generated from PN sequence generator, which are delayed from their counterpart sequences in the base station by the multipath propagation delay from the base station to the mobile unit**, see lines 24-38, col. 9 and element 106, Fig. 3);

frequency error estimators (**cross product circuits**, see element 146, Fig. 3; note that one cross product circuit is used for each finger) for computing a frequency error estimate (**frequency error**, see element 44, Fig. 3) for each ray based on successive values of a respective one of the channel estimates (**each finger makes an estimate of the frequency error using the cross product operator**, see lines 39-47, and equation 3, col. 6 and Fig. 3); and

at least one summer (**frequency error combiner**, see element 26, Fig. 2) for performing a weighted summation of the frequency error estimates to provide at least one relative frequency error estimate (**frequency error estimate from each finger 44a-c are combined and integrated in the frequency error combiner to generate an integrator output to adjust the clock frequency in order to compensate for the frequency error of the local oscillator**, see lines 48-54, col. 6 and Fig. 2),

Easton does not explicitly disclose producing at least two combined frequency error estimates and at least two summers for performing weighted summations of groups of the frequency error estimates to provide at least two combined frequency error estimates, wherein each of the combined frequency error estimates corresponds to a respectively different one of at least two base station transmitters.

However, Lundby discloses an apparatus to perform a method to account for multipath signals by providing outputs from a plurality of two-channel fingers (at least two multipath propagation channels, see paragraph 0101) at a remote station, each of which tracks a primary or secondary received signals t a slightly different PN offset, to a summing unit. The summing unit sums the primary channel output produced by each primary channel finger 980 (a first summer to provide one estimate for a group of primary channels with a primary channel coming from each finger, see paragraph 0101 and Fig. 9), and sums the secondary channel output produced by each secondary channel finger 980 (a second summer to provide one estimate for a group of secondary channels with a secondary channel coming from each finger, see paragraph 0101 and Fig. 9). In addition, the summer may rescale the signals in order to keep the signal within an acceptable dynamic range (weighted summations of groups, see paragraph 0101). Each of the

primary channel and secondary channel estimates corresponds to respective single base station (see paragraph 0087).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the CDMA transceiver apparatus and method of Easton with the teaching of Lundby such that it will employ using a plurality of two-channel fingers to provide a rescaled group of primary and secondary channel estimates to a summing circuit that comprises a first summer for a first group of primary channel outputs and a second summer for a second group of secondary channel outputs. The motivation to do so is to use to two channels rather than one to produce a higher gain and a reduced power transmission requirement within the communication system because the transmit power of each of the transmission channels can be less than one half the transmit power needed to maintain a desired bit error rate had only a single channel been used.

Regarding claims 73, 75, 81, 82, Easton discloses an apparatus to perform the method for estimating a frequency error (**each finger makes an estimate of the frequency error**) between a local frequency reference of a receiver and carrier frequencies of one or more transmitters (**to adjust clock frequency of local oscillator in the analog transmitter and receiver**, see lines 52-54, col. 6) comprising:

frequency error estimators for estimating frequency errors separately for each transmitter (**cross product circuits**, see element 146, Fig. 3; note that one cross product circuit is used for each finger); and

a combiner for combining the frequency error estimates to produce at least one relative frequency error estimate (**frequency error estimate from each finger 44a-c are combined and integrated in the frequency error combiner to generate an integrator output to adjust the clock frequency in order to compensate for the frequency error of the local oscillator**, see lines 48-54, col. 6 and Fig. 2).

Easton does not explicitly disclose combiners for combining groups of the frequency error estimates to produce at least two combined frequency error estimates.

However, Lundby discloses an apparatus to perform a method to account for multipath signals by providing outputs from a plurality of two-channel fingers (at least two multipath propagation channels, see paragraph 0101) at a remote station, each of which tracks a primary or secondary received signals t a slightly different PN offset, to a summing unit. The summing unit sums the primary channel output produced by each primary channel finger 980 (a first combiner to provide one estimate for a group of primary channels with a primary channel coming from each finger, see paragraph 0101 and Fig. 9), and sums the secondary channel output produced by each secondary channel finger 980 (a second combiner to provide one estimate for a group of secondary channels with a secondary channel coming from each finger, see paragraph 0101 and Fig. 9). In addition, the summer may rescale the signals in order to keep the signal within an acceptable dynamic range (weighted summations of groups, see paragraph 0101). Each of the primary channel and secondary channel estimates corresponds to respective single base station (see paragraph 0087).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the CDMA transceiver apparatus and method of Easton with the

teaching of Lundby such that it will employ using a plurality of two-channel fingers to provide a rescaled group of primary and secondary channel estimates to a summing circuit that comprises a first combiner for a first group of primary channel outputs and a second combiner for a second group of secondary channel outputs. The motivation to do so is to use to two channels rather than one to produce a higher gain and a reduced power transmission requirement within the communication system because the transmit power of each of the transmission channels can be less than one half the transmit power needed to maintain a desired bit error rate had only a single channel been used.

Regarding claims 74 & 76, Easton discloses the apparatus of claim 73 to perform the method of claim 75, further comprising integrating the combined frequency error estimates (see lines 48-49, col. 6).

Regarding claim 77, Easton discloses the transceiver of claim 15, wherein at least one of the base station relative frequency error estimates is formed using two or more fingers of a RAKE receiver (a integrator frequency error estimate output is formed by combining frequency estimates from each finger 44a-c of a RAKE receiver, see col. 6, lines 28-65 and Fingers 12 of RAKE receiver, Fig, 2).

Regarding claim 78, Easton discloses the method of claim 30, wherein at least one of the base station frequency error estimates is formed using two or more fingers of a RAKE receiver (a integrator frequency error estimate output is formed by combining frequency estimates from

each finger 44a-c of a RAKE receiver, see col. 6, lines 28-65 and Fingers 12 of RAKE receiver, Fig, 2).

Regarding claim 79, Easton discloses the apparatus of claim 73, wherein at least one of the transmitters frequency error estimates is formed using two or more fingers of a RAKE receiver (a integrator frequency error estimate output is formed by combining frequency estimates from each finger 44a-c of a RAKE receiver, see col. 6, lines 28-65 and Fingers 12 of RAKE receiver, Fig, 2).

Regarding claim 80, Easton discloses the transceiver of claim 75, wherein at least one of the transmitter frequency error estimates is formed using two or more fingers of a RAKE receiver (a integrator frequency error estimate output is formed by combining frequency estimates from each finger 44a-c of a RAKE receiver, see col. 6, lines 28-65 and Fingers 12 of RAKE receiver, Fig, 2).

Response to Arguments

3. Applicant's arguments with respect to claims 15, 30, 73-82 have been considered but are moot in view of the new ground(s) of rejection.

Allowable Subject Matter

4. Claims 10-11, 25-26, 31-40, 41-58, 62, 66-72 are allowed.

The following is a statement of reasons for the indication of allowable subject matter.

In claim 10, a transceiver comprising an error detection decoder for performing an error check on the decoded information bits, and to generate an error or no-error indication, wherein the relative frequency error estimate is only used to control the local reference oscillator when a no-error indication is generated.

In claim 25, a method for processing code division multiple access signals received through at least one multipath propagation channel to produce at least one relative frequency error estimate, comprising the steps of:

performing an error check on the decoded information bits and to generate an error or no-error indication, wherein the relative frequency error estimate is only used to control the local reference oscillator when a no-error indication is generated.

In claim 31, a transceiver for processing code division multiple access signals received through at least one multipath propagation channel to produce at least one relative frequency error estimate, comprising:

frequency error correctors for correcting frequency errors on each of the despread value streams by, for each of the despread value streams, progressively rotating the phase angle of successive despread values at a rate given by an associated frequency error integral.

In claim 41, a method for processing code division multiple access signals received through at least one multipath propagation channel to produce at least one relative frequency error estimate, comprising:

frequency error correctors for correcting frequency errors on each of the despread value streams by, for each of the despread value streams, progressively rotating the phase angle of successive despread values at a rate given by an associated frequency error integral.

In claim 62, a transceiver for processing code division multiple access signals received through at least one multipath propagation channel to produce at least one relative frequency error estimate, comprising:

wherein the combiner adds the real parts of the per ray frequency error estimates to obtain a real sum and adding the imaginary parts to produce an imaginary sum and computing the two-argument arctangent of the real and imaginary sum.

In claim 66, a method for processing code division multiple access signals received through at least one multipath propagation channel to produce at least one relative frequency error estimate, comprising the steps of:

wherein the combining step includes adding the real parts of the per-ray frequency error estimates to obtain a real sum and adding the imaginary parts to produce an imaginary sum and computing the two-argument arctangent of the real and imaginary sum.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US Patent 5,740,208 to Hulbert et al.

US Patent 5,930,288 to Eberhardt

US Patent 6,067,292 to Huang et al.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin Mew whose telephone number is 571-272-3141. The examiner can normally be reached on 9:00 am - 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wellington Chin can be reached on 571-272-3134. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KDM
Art Unit 2664

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